What Can We Learn by Sharing Local Seasonal Markers with Other Schools Around the World?

Purpose

This activity promotes collaborations among teachers during and after the GLOBE teacher training program. It helps teachers and students learn how to work with the GLOBE data system and GLOBEMail email. It also helps teachers and students learn how the protocols are interconnected and can support inquiry-based investigations.

Overview

The central topic of this activity is seasonal markers, which are the various biological, physical and cultural changes which mark transition points in the annual cycles of seasons. Examples are the first snowfall, the beginning of monsoon rains, and the summer solstice. Teachers begin this activity in the GLOBE teacher training workshop by discussing the differences in seasonal patterns among their respective communities. Then the teachers agree on a list of 5 seasonal markers which they would like the teachers and their students to observe in their own communities. When teachers return to their schools, they engage their students in the activity, and use GLOBEMail over the next several months to share the seasonal marker observations. By comparing GLOBE data with the shared seasonal marker information, students are able to conduct their own collaborative investigations of seasonal patterns. The collaboration also promotes on-going collegial support among the teachers to help each other in implementing the full GLOBE Program.

Time

One hour and a half in the GLOBE Teacher Training Workshop.

About 15 minutes per week over the next several weeks.

Level

Teachers and students at all levels

Key Concepts

Seasonal patterns, with a special focus on seasonal markers

Skills

Communicating data and comments using GLOBEMail

Exploring seasonal patterns in the GLOBE Student Data Archive

Collaborating with other GLOBE schools

Materials and Tools

Access to GLOBEMail

World maps (black and white line master on 8 1/2 x 11 sheet) - one per participant

Preparation

Teachers begin this activity at the workshop, then continue it with their students

Prerequisites

Teachers need to attend the GLOBE Teacher Training Workshop, during which this activity is launched.

Background

Seasonal markers are indicators of seasonal change. For example, the first appearance of a particular migrating bird, such as a robin, is a classic marker of spring. Examples of other markers are ice melting on lakes, the thawing of soil, emerging leaves on trees, and warming temperatures. Notice that in this list there are examples relating to hydrology, soil, biology and atmosphere. In this activity, you learn more about seasonal markers and begin to share observations of markers with your teacher colleagues..

You will use GLOBEMail to communicate with other schools. GLOBEMail is an electronic mail system, in which you can write letters and send them by email to other teachers and students. GLOBEMail is different from the GLOBE data system in which you send the data values from the GLOBE protocols. Rather, GLOBEMail enables you to go beyond the raw data, and have more open-ended communications, to share ideas, to reflect on your experiences teaching GLOBE, and to help other teachers as you work through some of the challenges of implementing GLOBE. Such collegial support can be a real help to you as you begin to implement GLOBE. For your students, GLOBEMail enables them to work collaboratively on investigations with other students throughout the world.

Seasonal markers are not a standard GLOBE protocol and are not part of the GLOBE data system. Therefore, you and your students will use GLOBEMail as an informal way to share the seasonal marker observations. As shown in the example below, you simply enter the marker observation as a comment in the GLOBEMail message. Be sure to describe the marker and include the data. It also helps to add a personal note that might make the observation more interesting or informative.

These GLOBEMail messages also provide the opportunity for you to share other comments about your experiences teaching GLOBE. You know the teachers who will receive this message, since they were your colleagues in the GLOBE Teacher Training Workshop. Therefore, they are likely to be interested and perhaps helpful in their response to your GLOBEMail messages. Your students can also use GLOBEMail to share ideas for and results of collaborative investigations.

GLOBEMail

To: Seasonal Markers Team

From: *School name*

Today (Nov 13) was the first snowfall. It was only a dusting, but this is the earliest we've ever had snow.

Incidentally, we have just begun to use the data server to explore plotting data on graphs. We were surprised by some abnormal "blips" in the local temperature graph. When we investigated this, we found out that a student had entered Fahrenheit temperature instead of Celsius. So, we suggest graphing your data as a way to find errors in your data.

What To Do and How To Do It

Phase 1 – During the GLOBE Teacher Training Workshop

Step 1: Workshop leader explains the purpose
The workshop leader introduces this activity, explaining that this activity has three goals. First, it helps teachers understand the GLOBE seasons module. Second, it helps teachers stay in contact and help each other after the GLOBE Teacher Training Workshop. Third it provides an interesting seasons investigation for your students.

Through this activity, students and teachers share detailed observations of seasonal changes in their local communities, and work together to investigate regional patterns in the seasonal changes. Teachers in previous workshops have requested a way to maintain contact with their new GLOBE colleagues, to help each other implement GLOBE, and to participate in a collaborative investigation using GLOBE data.

Step 2: Groups of teachers discuss seasonal variations
Form groups of about 10 teachers. Distribute world maps, one per teacher. (If all teachers are from a single country or region of the world, it might make more sense to use a regional map.) On the maps, each group plots where each teacher is from. Write the name of the teacher and the town on the map.

Then discuss the differences in seasons among the different locations. For example, some schools might have snow for several months in the year, others might have none. Try to discuss both qualitative and quantitative differences, including when the seasonal changes generally occur. This discussion is richer if there are teachers from many parts of the world. If you don't have such broad geographical diversity, you might spend some time in the discussion speculating on seasonal variations in other parts of the world.

Step 3: Groups of teachers discuss seasonal markers
Next each group discusses seasonal markers. The workshop leader should make sure everyone understands what seasonal markers are (refer to background). Each group brainstorms a list of seasonal markers that might be observed at different times by the different teachers in the group. For each marker, indicate which season it is associated with. (Equatorial regions should use local definitions of seasons such as dry and monsoon.)

Here are some markers that the teachers might identify:

- bird migrations
- lake freezes
- monsoon rains
- bud break
- mosquitoes
- bull frogs croaking
- first frost
- heavy pollen
- first snow
- first crocuses
- startwhale migrations
- leaves begin fall colors
- butterfly migration
- first tomatoes
- first day w/no coat

Step 4: Select which markers to investigate
Bring all the groups together and have each group describe their markers out loud. Then have the full group select five markers which a) all or most of the teachers will be able to observe, b) occur over the next four months, and c) are likely to show variation from one school to another. (The number of markers and the length of time are reasonable figures, but the group may decide on other values.) Make sure each teacher has a list of the selected markers.

Step 5: Workshop leader explains what happens

after the workshop
The workshop leader explains that all teachers (with the help of their students) will watch for the occurrences of the seasonal markers, over the next several months. As detailed below, students and teachers will:

- share their observations of the seasonal marker events with the other teachers
- investigate the data from these observations and share their own analyses of the patterns in the seasonal markers
- help each other by sharing their experiences implementing GLOBE
- work together on collaborative investigations with students from other GLOBE schools

Make sure the teachers understand the purpose and nature of this follow-up activity. You should also check on the degree of expected participation. Some teachers may be quite interested in this investigation, and others may not. Among the interested teachers, divide the full group into smaller groups of about ten teachers (more teachers could be overwhelming in terms of the total email). The teachers should also decide if they want to begin right away, or whether they want to wait a few weeks before beginning.

Phase 2 – After the workshop

Step 6: Get started using GLOBEMail
After you finish the GLOBE training session, you should begin to implement the standard GLOBE protocols and learning activities. You can begin to use GLOBEMail at any point.

Send a hello message to your colleagues. You should also begin to receive messages from your colleagues.

GLOBEMail

To: Seasonal Markers Team

From: School name

It is June 12, and the monsoon rains have just begun. This is when we typically have a big party, dancing in the rain. Did you know that the word monsoon is derived from "mausim" which is the Arabic word for season?

Step 7: Send a GLOBEMail message whenever a seasonal marker occurs

With your students, pay attention to the environment around you, noticing when each of the seasonal markers occurs. Whenever it does, send a GLOBEMail message to your seasonal markers teammates, indicating the marker, the date and any other comments you and your students would like to add.

Step 8: Monitor your incoming GLOBEMail for messages, and plot the data
Whenever you receive a GLOBEMail message from one of the participating schools, have your students record the information on a map. You might want to have a different map for each of the seasonal markers. You might also want your students to make a chart listing each marker and the location and date of each observation.

Step 10: Conduct your own investigations!
As you and your students do your own local observations, and as you peruse the observations from the other schools, you and your students may notice some patterns. For example, they may notice that the further south a school is, the sooner they see the first spring robin. Or they may notice that lakes freeze sooner inland than near the coast. Have your students use GLOBEMail to share these speculations with the other schools.

Your students should also use GLOBE's data server to explore GLOBE student data which might provide further insights into the seasonal patterns. They might find that the coldest day of the year is generally one month after the Winter solstice. Or they might find that robins only start to appear after the local temperature has reached an average of 40 deg F. Use GLOBEMail to share these speculations with the other schools.

Your students can extend these investigations with seasonal data. They might find patterns linking

GLOBE data with seasonal markers. They might predict when a particular marker will occur and see how close their guess is to reality. They also can relate the seasonal markers with the other seasons activities described elsewhere in this module.

GLOBE is a wonderful resource for conducting a wide range of investigations. The seasonal markers investigation provides you and your students the opportunity to participate in your own investigations, to share observations and ideas with other schools, and conduct collaborative investigations with other schools around the world. Also, GLOBEMail enables you, as a teacher, to provide mutual support with other teachers as you implement GLOBE. Most importantly, this activity enables you and your students to experience and participate in the excitement of science research enabled by GLOBE's world-wide network of students, teachers and scientists.